

CLAIMS

1           1. An oral brush suitable for massaging the gums,  
2 comprising:  
3           an elongated body;  
4           a head portion extending from said body; and  
5           a brush portion comprising a plurality of bristles  
6 extending from said head portion, said bristles comprising a  
7 thermoplastic elastomer having a Shore A hardness of 30 or  
8 greater.

1           2. The oral brush of claim 1 wherein said  
2 thermoplastic elastomer is selected from the group  
3 consisting of polyetheramides, polyesters, styrene-ethylene-  
4 butylene-styrene block copolymers, styrene-butadiene-styrene  
5 block copolymers, styrene-isoprene-styrene block copolymers,  
6 polyurethanes, polyolefin elastomers, and mixtures thereof.

1           3. The oral brush of claim 1 or 2 wherein said  
2 thermoplastic elastomer has a flexural modulus of at least 5  
3 MPa.

1           4. The oral brush of claim 1, said oral brush  
2 further comprising a spacer attached to a base of said head  
3 portion, said spacer comprising said thermoplastic elastomer  
4 and integrally joined to said bristles.

1           5. The oral brush of claim 1 wherein said brush  
2 portion further comprises a plurality of bristles formed of  
3 a non-elastomeric material.

1           6. The oral brush of claim 5 wherein said non-  
2 elastomeric material is selected from nylon and polyamides.

1           7. The oral brush of claim 6 wherein said non-  
2 elastomeric material is a crystalline polyphthalamide formed  
3 by polymerization of terphthalic acid, isophthalic acid and  
4 adipic acid with hexamethylene diamine.

1           8. The oral brush of claim 5 wherein said non-  
2 elastomeric material comprises an abrasive additive.

1           9. The oral brush of claim 5, further comprising a  
2 spacer attached to a base of said head portion, said  
3 bristles formed of said non-elastomeric material extending  
4 from said head portion through said spacer.

1           10. An oral brush comprising:  
2 an elongated body;  
3 a head portion extending from said body; and  
4 a brush portion comprising a plurality of bristles  
5 extending from said head portion, said bristles comprising a  
6 thermoplastic elastomer selected from the group consisting  
7 of polyetheramides, polyesters, styrene-ethylene-butylene-  
8 styrene block copolymers, styrene-butadiene-styrene block  
9 copolymers, styrene-isoprene-styrene block copolymers,  
10 polyurethanes, polyolefin elastomers, and mixtures thereof.

1           11. The oral brush of claim 10 wherein said brush  
2 portion further comprises a plurality of bristles formed of  
3 a non-elastomeric material.

1           12. The oral brush of claim 11 wherein said non-  
2 elastomeric material is selected from polyamides and  
3 polyesters.

1           13. The oral brush of claim 12 wherein said non-  
2 elastomeric material is a crystalline polyamide formed by  
3 polymerization of terphthalic acid, isophthalic acid and  
4 adipic acid with hexamethylene diamine.

1           14. The oral brush of claim 11 wherein said non-  
2 elastomeric material comprises an abrasive additive.

1           15. The oral brush of claim 11, said oral brush  
2 further comprising a spacer attached to a base of said head  
3 portion, said bristles formed of said non-elastomeric  
4 material extending from said head portion through said  
5 spacer.

1           16. The oral brush of claim 10 wherein said  
2 thermoplastic elastomer has a flexural modulus of at least 5  
3 MPa.

1           17. The oral brush of claim 10, said oral brush  
2 further comprising a spacer attached to a base of said head  
3 portion, said spacer comprising said thermoplastic elastomer  
4 and integrally joined to said bristles.

1           18. An oral brush comprising:  
2 an elongated body;  
3 a head portion extending from said body; and  
4 a brush portion comprising a plurality of bristles  
5 extending from said head portion, said bristles comprising a  
6 thermoplastic elastomer having a flexural modulus of at  
7 least 5 MPa.

1           19. The oral brush of claim 18, said oral brush  
2 further comprising a spacer attached to a base of said head

3 portion, said spacer comprising said thermoplastic elastomer  
4 and integrally joined to said bristles.

1 20. An oral brush comprising:  
2 an elongated body;  
3 a head portion extending from said body; and  
4 a brush portion comprising, extending from said head  
5 portion, a plurality of bristles comprising a thermoplastic  
6 elastomer and a plurality of bristles comprising a  
7 polyphthalamide.

1 21. The oral brush of claim 20 wherein said  
2 polyphthalamide is formed by polymerization of terphthalic  
3 acid, isophthalic acid and adipic acid with hexamethylene  
4 diamine.

1 22. The oral brush of claim 21 wherein said  
2 polyphthalamide comprises an abrasive additive.

1 23. The oral brush of claim 20, said oral brush  
2 further comprising a spacer attached to a base of said head  
3 portion, said spacer comprising said thermoplastic elastomer  
4 and integrally joined to said bristles comprising said  
5 thermoplastic elastomer.

1 24. The oral brush of claim 23, wherein said  
2 bristles comprising said polyphthalamide extend from said  
3 head portion through said spacer.

1 25. A method of massaging the gums comprising  
2 contacting the gums with a bristle formed of a thermoplastic  
3 elastomer having a Shore A hardness of at least 30.

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1           26. A method of massaging the gums comprising  
2     contacting the gums with a bristle formed of a thermoplastic  
3     elastomer having a flexural modulus of at least 5 MPa.

1           27. A method of massaging the gums comprising  
2     contacting the gums with a bristle formed of a thermoplastic  
3     elastomer selected from the group consisting of  
4     polyetheramides, polyesters, styrene-ethylene-butylene-  
5     styrene block copolymers, styrene-butadiene-styrene block  
6     copolymers, styrene-isoprene-styrene block copolymers,  
7     polyurethanes, polyolefin elastomers, and mixtures thereof.

1           28. An oral brush comprising:  
2     an elongated body;  
3     a head portion extending from said body; and  
4     a brush portion comprising a plurality of bristles  
5     extending from said head portion, said bristles comprising a  
6     thermoplastic elastomer sheath, comprising a thermoplastic  
7     elastomer selected from the group consisting of  
8     polyetheramides, polyesters, styrene-ethylene-butylene-  
9     styrene block copolymers, styrene-butadiene-styrene block  
10    copolymers, styrene-isoprene-styrene block copolymers,  
11    polyurethanes, polyolefin elastomers, and mixtures thereof,  
12    surrounding a non-thermoplastic elastomer core material.

1           29. The oral brush of claim 28 wherein said  
2     bristles are formed by coextrusion.

1           30. The oral brush of claim 28 wherein said core  
2     material is selected from polyamides and polyesters.

1           31. The oral brush of claim 28 wherein said  
2     bristles have a diameter of from 5 to 8 mil.

32. The oral brush of claim 28, said oral brush further comprising a spacer attached to a base of said head portion, said spacer comprising said thermoplastic elastomer and integrally joined to said bristles.

1 33. A method of making a toothbrush bristle  
2 comprising coextruding a plurality of polymers to form an  
3 elongated filament having a plurality of separate phases.

1 34. The method of claim 33 wherein one of said  
2 polymers comprises a thermoplastic elastomer.

1 35. The method of claim 33 wherein said polymers  
2 are coextruded in a sheath/core geometry.

1 36. The method of claim 33 further comprising  
2 applying tension to said filament to draw the filament.

1 37. The method of claim 36 wherein the tension is  
2 applied at a drawdown ratio of from 1:1 to 7:1.

1 38. An oral brush comprising:  
2 an elongated body;  
3 a head portion extending from said body; and  
4 a brush portion comprising a plurality of bristles  
5 extending from said head portion, said bristles comprising a  
6 thermoplastic elastomer sheath surrounding a core comprising  
7 a thermoplastic elastomer having a higher hardness than said  
8 thermoplastic elastomer sheath.

1 39. An oral brush comprising:  
2 an elongated body;  
3 a head portion extending from said body;  
4 and a brush portion comprising a plurality of  
5 bristles extending from said head portion, said bristles  
6 comprising a blend comprising an elastomeric polymer and a  
7 non-elastomeric polymer.

1 40. The oral brush of claim 39, said oral brush  
2 further comprising a spacer attached to a base of said head  
3 portion, said spacer comprising said thermoplastic elastomer  
4 and integrally joined to said bristles.

1 41. The oral brush of claim 39 wherein said  
2 elastomeric polymer is selected from the group consisting of  
3 thermoplastic elastomers and vulcanized rubber-type  
4 polymers.

1 42. The oral brush of claim 41 wherein said  
2 elastomeric polymer comprises a thermoplastic elastomer  
3 selected from the group consisting of polyamide  
4 thermoplastic elastomers, polyester thermoplastic  
5 elastomers, and olefinic thermoplastic elastomers.

1 43. The oral brush of claim 41 wherein said  
2 elastomeric polymer comprises a vulcanized rubber-type  
3 polymer selected from the group consisting of natural  
4 rubber, cross-linked polybutadiene, and cross-linked  
5 polyacrylates and mixtures thereof.

1            44. The oral brush of claim 39 wherein said  
2 elastomeric polymer and said non-elastomeric polymer are  
3 provided in a ratio of from 10:90 to 90:10.

add A2  
Add B17  
add D4

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